WE CLAIM:

1. A contaminant control system for removal of carbon dioxide and other trace contaminants from air used for environmental control comprising:

an absorber element in communication with a stripper element, the combination communicable with a power source and a control and data processor;

said absorber element having an air inlet in communication with an air source, said inlet in communication with a scrubber;

a charcoal bed filter in communication with said scrubber to receive air flow output therefrom;

said charcoal filter having an air outlet in communication with said air source;

a liquid absorbent tank in communication with said absorber element, said stripper element and an a liquid absorbent heater; and

an acid water tank in communication with said absorber element and an acid water cooler.

2. The contaminant control system as in claim 1 wherein said scrubber is comprised of a rotary contact processor.

3. The contaminant control system as in claim 1 wherein said stripper element is comprised of a rotary contact processor.

4. The contaminant control system as in claim 2 wherein said scrubber is comprised of a carbon dioxide scrubber in fluid communication with a liquid absorbent scrubber.

5. The contaminant control system as in claim 2 wherein said rotary contact processor comprises:

a carbon dioxide scrubber rotor in serial communication with a liquid absorbent scrubber rotor connected by a rotor shaft rotatably assembled on a plurality of bearings in a housing;

said carbon dioxide scrubber rotor in communication with said air inlet and a liquid absorbent inlet wherein a liquid absorbent is introduced as a mist into an air flow through said air inlet, said air flow introduced into a carbon dioxide scrubber chamber having a first heat and mass transfer surface therein of said carbon dioxide scrubber rotor;

said air flow passing through said carbon dioxide scrubber rotor through a plurality of first air passage tubes and a plurality of first mist separators to be introduced downstream into an acid wash scrubber chamber separated therefrom by a baffle and having a second heat and mass transfer surface therein;

said baffle having an acid water wash inlet for introduction of a liquid acid water wash as a mist in said air flow;

said air flow passing through said liquid absorbent scrubber rotor through a plurality of second air passage tubes and a plurality of second mist separators to a fan causing said air flow to exit said rotary contact processor through an air exhaust;

a first pitot pump in said carbon dioxide scrubber chamber for liquid absorbent circulation and exit through an a liquid absorbent outlet; and

a second pitot pump in said acid wash scrubber chamber for liquid acid water circulation and exit through an acid water outlet.

6. The contaminant control system as in claim 5 wherein said liquid acid water wash is cold.

7. A contaminant control system for removal of carbon dioxide and other trace contaminants from air used for environmental control in a vehicle comprising:

an absorber element rotary contact processor in communication with a stripper element rotary contact processor, the combination communicable with a power source and a control and data processor;

said absorber element having an air inlet in communication with a vehicle air source, said inlet in communication with a scrubber;

a charcoal bed filter in communication with said scrubber to receive air flow output therefrom;

said charcoal filter having an air outlet in communication with said vehicle air source;

a liquid absorbent tank in communication with said absorber element, said stripper element and an a liquid absorbent heater; and

an acid water tank in communication with said absorber element and an acid water cooler.

8. A rotary contact processor for direct contact liquid absorbent and gas contaminant processing comprising:

a first scrubber rotor in serial communication with a second scrubber rotor each assembled on a rotor shaft rotatably mounted on a plurality of bearings in a housing;

said first scrubber rotor in communication with a gas inlet and a liquid absorbent inlet wherein a liquid absorbent is introduced as a mist into a gas flow through said gas inlet, said gas flow introduced into a first scrubber chamber having a first heat and mass transfer surface therein of said first scrubber rotor;

said gas flow passing through said first scrubber rotor through a

plurality of first gas passage tubes and a plurality of first mist separators to be introduced downstream into a second scrubber chamber in fluid communication therewith and having a second heat and mass transfer surface therein;

said second scrubber chamber having a liquid absorbent wash inlet for introduction of a liquid absorbent wash as a mist in said gas flow;

said gas flow passing through said liquid absorbent scrubber rotor through a plurality of second gas passage tubes and a plurality of second mist separators to a fan causing said gas flow to exit said rotary contact processor through a gas exhaust;

a first pitot pump in said first scrubber chamber for liquid absorbent wash circulation and exit through a liquid absorbent outlet; and

a second pitot pump in said second scrubber chamber for liquid absorbent wash circulation and exit through a liquid absorbent water outlet.

9. A rotary contact processor for direct contact liquid absorbent air contaminant processing comprising:

a carbon dioxide scrubber rotor in serial communication with an liquid absorbent scrubber rotor connected by a rotor shaft rotatably assembled on a plurality of bearings in a housing;

said carbon dioxide scrubber rotor in communication with an air inlet and a liquid absorbent inlet wherein a liquid absorbent is introduced as a mist into an air flow through said air inlet, said air flow introduced into a carbon dioxide scrubber chamber having a first heat and mass transfer surface therein of said carbon dioxide scrubber rotor;

said air flow passing through said carbon dioxide scrubber rotor through a plurality of first air passage tubes and a plurality of first mist separators to be introduced downstream into an acid wash scrubber chamber separated therefrom by a baffle and having a second heat and mass transfer

surface therein;

said baffle having an acid water wash inlet for introduction of a liquid acid water wash as a mist in said air flow;

said air flow passing through said liquid absorbent scrubber rotor through a plurality of second air passage tubes and a plurality of second mist separators to a fan causing said air flow to exit said rotary contact processor through an air exhaust;

a first pitot pump in said carbon dioxide scrubber chamber for liquid absorbent circulation and exit through a liquid absorbent outlet; and

a second pitot pump in said acid wash scrubber chamber for liquid acid water circulation and exit through an acid water outlet.

10. The rotary contact processor as in claim 9 wherein said liquid absorbent inlet and said liquid absorbent outlet are in communication with a liquid absorbent tank, a liquid absorbent heater and a stripper element.

11. The rotary contact processor as in claim 9 wherein said acid water wash inlet and said acid water wash outlet are in communication with an acid water tank and an acid water cooler.

12. A method for removal of carbon dioxide and other trace contaminants from air used in environmental control, comprising the steps of:

introducing an air flow into a carbon dioxide scrubber rotor and spraying a liquid absorbent mist into said air flow;

rotating said carbon dioxide scrubber rotor to separate said liquid absorbent containing absorbed carbon dioxide and trace contaminants from said air flow;

accumulating said liquid absorbent on a first heat and mass

transfer surface for extraction from said carbon dioxide scrubber rotor;

passing said airflow downstream of said carbon dioxide scrubber rotor through a plurality of first air passages and a plurality of first mist separators to a liquid absorbent scrubber rotor;

spraying a liquid acid wash into said air flow;

rotating said liquid absorbent scrubber rotor to separate said liquid acid wash containing liquid absorbent, carbon dioxide and trace contaminants from said air flow;

accumulating said liquid acid wash on a second heat and mass transfer surface for extraction from said liquid absorbent scrubber rotor; and

passing air flow downstream of said liquid absorbent scrubber rotor through a fan to an air exhaust.

13. The method as in claim 12 wherein said extracted liquid absorbent is processed in a stripper element for reuse.

14. A method for reconditioning a contaminated liquid absorbent, comprising the steps of:

heating a liquid absorbent containing a carbonate to a decomposition temperature in a liquid absorbent heater;

communicating said liquid absorbent into a scrubber;

spraying said liquid absorbent onto a rotating heat and mass transfer surface for separation of said liquid absorbent from an absorbed carbon dioxide;

accumulating said liquid absorbent for extraction from said scrubber; and

passing said carbon dioxide through a plurality of mist separators for output from said scrubber.

15. The method as in claim 14 further comprising the steps of:

communicating said carbon dioxide into a second scrubber;

washing said carbon dioxide using a spray of a cold liquid absorbent;

spraying said cold liquid absorbent onto a rotating mass and heat transfer surface for separation of said cold liquid absorbent from said carbon dioxide;

accumulating said cold liquid absorbent for extraction from said second scrubber; and

passing said carbon dioxide through a plurality of mist separators for output from said second scrubber.

16. The method as in claim 14 wherein said liquid absorbent is processed through a subsequent scrubber.

17. The method as in claim 15 wherein said cold liquid absorbent is processed through a subsequent scrubber.